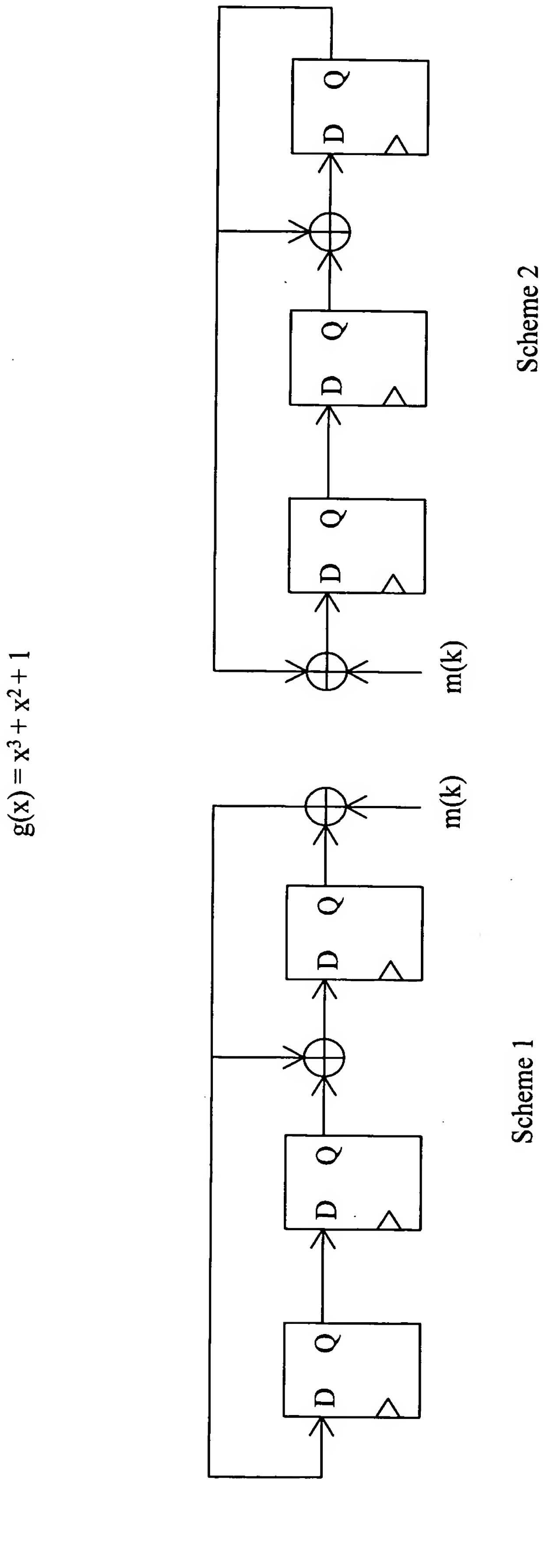
RABIN & BERDO, P.C.
CUSTOMER NO: 23995
APPLICANT: Kovsky T. J. TSAI et al.
TITLE: HIGH PERFORMANCE CRC...
FILED: December 17, 2003
ATTY DKT. NO. COR 137



Scheme 1

Scheme 2

Fig. 1

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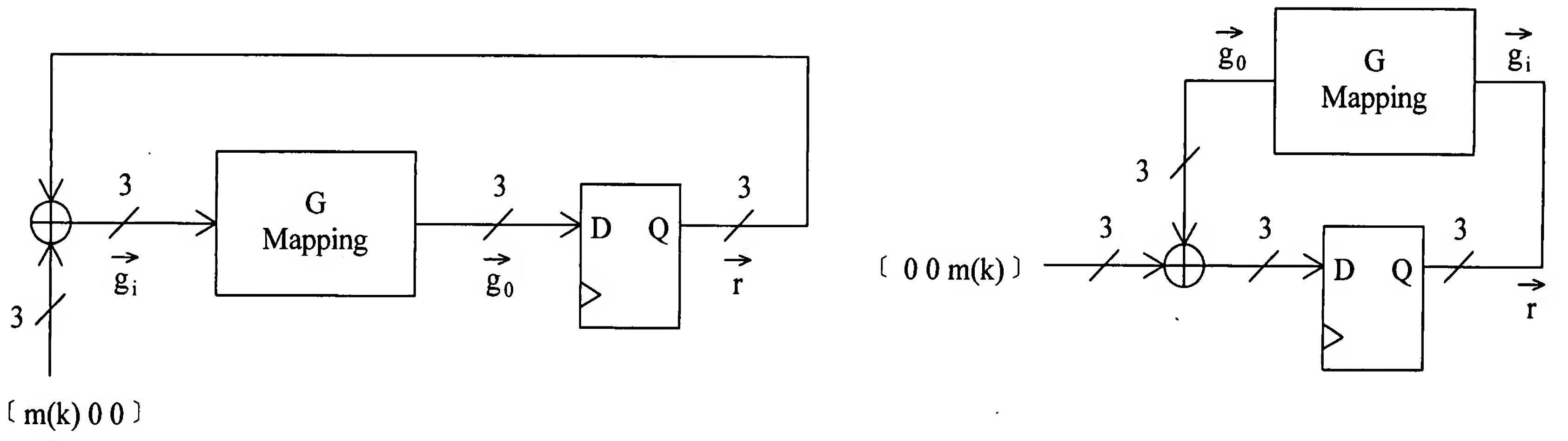

Scheme 1

Scheme 2

Fig. 2

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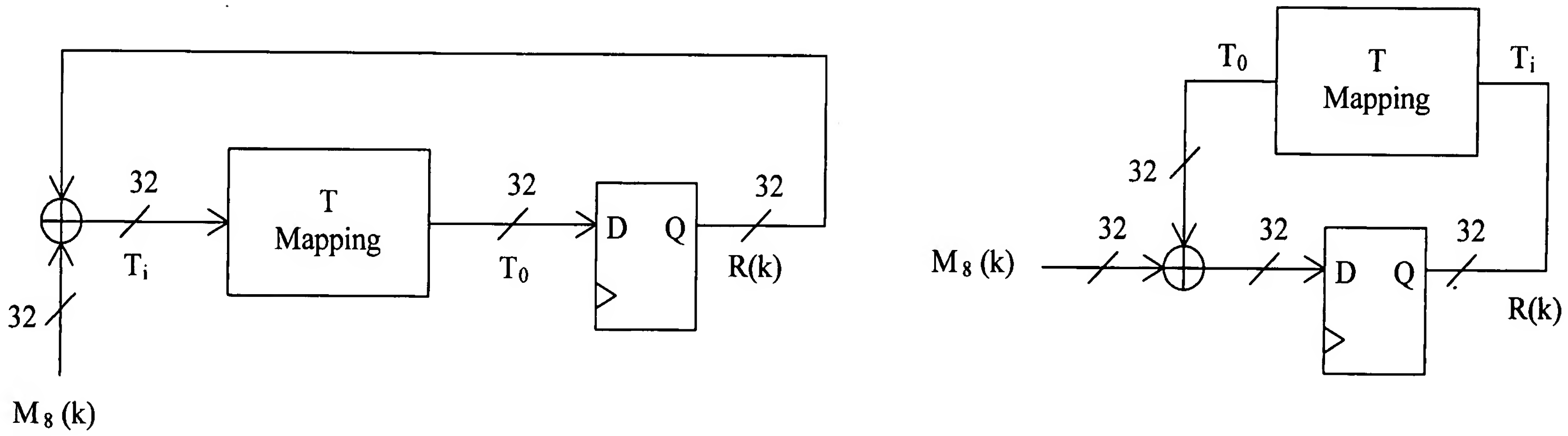
$$G = \begin{pmatrix} \text{Row31} & \text{0x40000000} \\ \text{Row30} & \text{0x20000000} \\ \text{Row29} & \text{0x10000000} \\ \text{Row28} & \text{0x08000000} \\ \text{Row27} & \text{0x04000000} \\ \text{Row26} & \text{0x82000000} \\ \text{Row25} & \text{0x01000000} \\ \text{Row24} & \text{0x00800000} \\ \text{Row23} & \text{0x80400000} \\ \text{Row22} & \text{0x80200000} \\ \text{Row21} & \text{0x00100000} \\ \text{Row20} & \text{0x00080000} \\ \text{Row19} & \text{0x00040000} \\ \text{Row18} & \text{0x00020000} \\ \text{Row17} & \text{0x00010000} \\ \text{Row16} & \text{0x80008000} \\ \text{Row15} & \text{0x00004000} \\ \text{Row14} & \text{0x00002000} \\ \text{Row13} & \text{0x00001000} \\ \text{Row12} & \text{0x80000800} \\ \text{Row11} & \text{0x80000400} \\ \text{Row10} & \text{0x80000200} \\ \text{Row9} & \text{0x00000100} \\ \text{Row8} & \text{0x80000080} \\ \text{Row7} & \text{0x80000040} \\ \text{Row6} & \text{0x00000020} \\ \text{Row5} & \text{0x80000010} \\ \text{Row4} & \text{0x80000008} \\ \text{Row3} & \text{0x00000004} \\ \text{Row2} & \text{0x80000002} \\ \text{Row1} & \text{0x80000001} \\ \text{Row0} & \text{0x80000000} \end{pmatrix} \qquad G^{-1} = \begin{pmatrix} \text{Row31} & \text{0x00000001} \\ \text{Row30} & \text{0x80000000} \\ \text{Row29} & \text{0x40000000} \\ \text{Row28} & \text{0x20000000} \\ \text{Row27} & \text{0x10000000} \\ \text{Row26} & \text{0x08000000} \\ \text{Row25} & \text{0x04000001} \\ \text{Row24} & \text{0x02000000} \\ \text{Row23} & \text{0x01000000} \\ \text{Row22} & \text{0x00800001} \\ \text{Row21} & \text{0x00400001} \\ \text{Row20} & \text{0x00200000} \\ \text{Row19} & \text{0x00100000} \\ \text{Row18} & \text{0x00080000} \\ \text{Row17} & \text{0x00040000} \\ \text{Row16} & \text{0x00020000} \\ \text{Row15} & \text{0x00010001} \\ \text{Row14} & \text{0x00008000} \\ \text{Row13} & \text{0x00004000} \\ \text{Row12} & \text{0x00002000} \\ \text{Row11} & \text{0x00001001} \\ \text{Row10} & \text{0x00000801} \\ \text{Row9} & \text{0x00000401} \\ \text{Row8} & \text{0x00000200} \\ \text{Row7} & \text{0x00000101} \\ \text{Row6} & \text{0x00000081} \\ \text{Row5} & \text{0x00000040} \\ \text{Row4} & \text{0x00000021} \\ \text{Row3} & \text{0x00000011} \\ \text{Row2} & \text{0x00000008} \\ \text{Row1} & \text{0x00000005} \\ \text{Row0} & \text{0x00000003} \end{pmatrix}$$

Fig. 3



Scheme 1

Scheme 2

Fig. 4

$$T = G^{8} = \left(\begin{array}{ll}
\text{Row31} & \text{0x20800000} \\
\text{Row30} & \text{0x90400000} \\
\text{Row29} & \text{0xc8200000} \\
\text{Row28} & \text{0x64100000} \\
\text{Row27} & \text{0xb2080000} \\
\text{Row26} & \text{0x59040000} \\
\text{Row25} & \text{0x0c020000} \\
\text{Row24} & \text{0x86010000} \\
\text{Row23} & \text{0x43008000} \\
\text{Row22} & \text{0x01004000} \\
\text{Row21} & \text{0x20002000} \\
\text{Row20} & \text{0x10001000} \\
\text{Row19} & \text{0x88000800} \\
\text{Row18} & \text{0xc4000400} \\
\text{Row17} & \text{0x62000200} \\
\text{Row16} & \text{0x31000100} \\
\text{Row15} & \text{0xb8000080} \\
\text{Row14} & \text{0xdc000040} \\
\text{Row13} & \text{0xee000020} \\
\text{Row12} & \text{0x77000010} \\
\text{Row11} & \text{0x1b000008} \\
\text{Row10} & \text{0x2d000004} \\
\text{Row9} & \text{0x36000002} \\
\text{Row8} & \text{0x1b000001} \\
\text{Row7} & \text{0xad000000} \\
\text{Row6} & \text{0xf6000000} \\
\text{Row5} & \text{0xfb000000} \\
\text{Row4} & \text{0x5d000000} \\
\text{Row3} & \text{0x8e000000} \\
\text{Row2} & \text{0xc7000000} \\
\text{Row1} & \text{0xc3000000} \\
\text{Row0} & \text{0x41000000}
\end{array}\right)
\begin{array}{c}
2\\3\\4\\4\\5\\5\\3\\4\\4\\2\\2\\2\\3\\4\\4\\4\\5\\6\\7\\7\\5\\5\\5\\5\\5\\6\\7\\5\\4\\5\\4\\2
\end{array}
\qquad
T^{-1} = G^{-8} = \left(\begin{array}{ll}
\text{Row31} & \text{0x000000d5} \\
\text{Row30} & \text{0x0000006a} \\
\text{Row29} & \text{0x00000035} \\
\text{Row28} & \text{0x0000001a} \\
\text{Row27} & \text{0x0000000d} \\
\text{Row26} & \text{0x00000006} \\
\text{Row25} & \text{0x000000d6} \\
\text{Row24} & \text{0x0000006b} \\
\text{Row23} & \text{0x80000035} \\
\text{Row22} & \text{0x400000cf} \\
\text{Row21} & \text{0x200000b2} \\
\text{Row20} & \text{0x10000059} \\
\text{Row19} & \text{0x0800002c} \\
\text{Row18} & \text{0x04000016} \\
\text{Row17} & \text{0x0200000b} \\
\text{Row16} & \text{0x01000005} \\
\text{Row15} & \text{0x008000d7} \\
\text{Row14} & \text{0x0040006b} \\
\text{Row13} & \text{0x00200035} \\
\text{Row12} & \text{0x0010001a} \\
\text{Row11} & \text{0x000800d8} \\
\text{Row10} & \text{0x000400b9} \\
\text{Row9} & \text{0x00040089} \\
\text{Row8} & \text{0x00020044} \\
\text{Row7} & \text{0x000080f7} \\
\text{Row6} & \text{0x000040ae} \\
\text{Row5} & \text{0x00002057} \\
\text{Row4} & \text{0x000010fe} \\
\text{Row3} & \text{0x000008aa} \\
\text{Row2} & \text{0x00000455} \\
\text{Row1} & \text{0x000002ff} \\
\text{Row0} & \text{0x000001aa}
\end{array}\right)
\begin{array}{c}
5\\4\\4\\3\\3\\2\\5\\5\\5\\7\\5\\5\\4\\4\\4\\3\\7\\6\\5\\4\\5\\6\\4\\3\\8\\6\\6\\8\\5\\5\\9\\5
\end{array}$$

Fig. 5

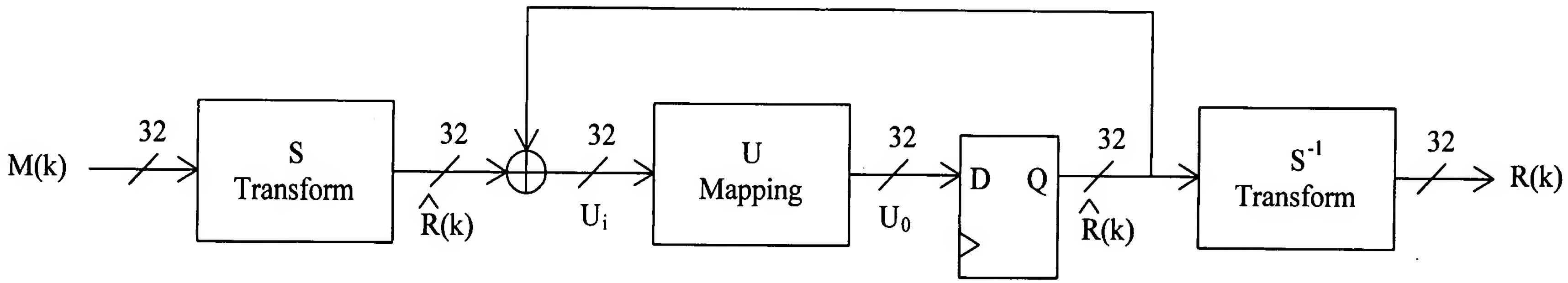

M(k)
32
S
Transform
32
$\hat{R}(k)$
32
U_i
U
Mapping
32
U_0
D
Q
32
$\hat{R}(k)$
S^{-1}
Transform
32
R(k)

Fig. 6

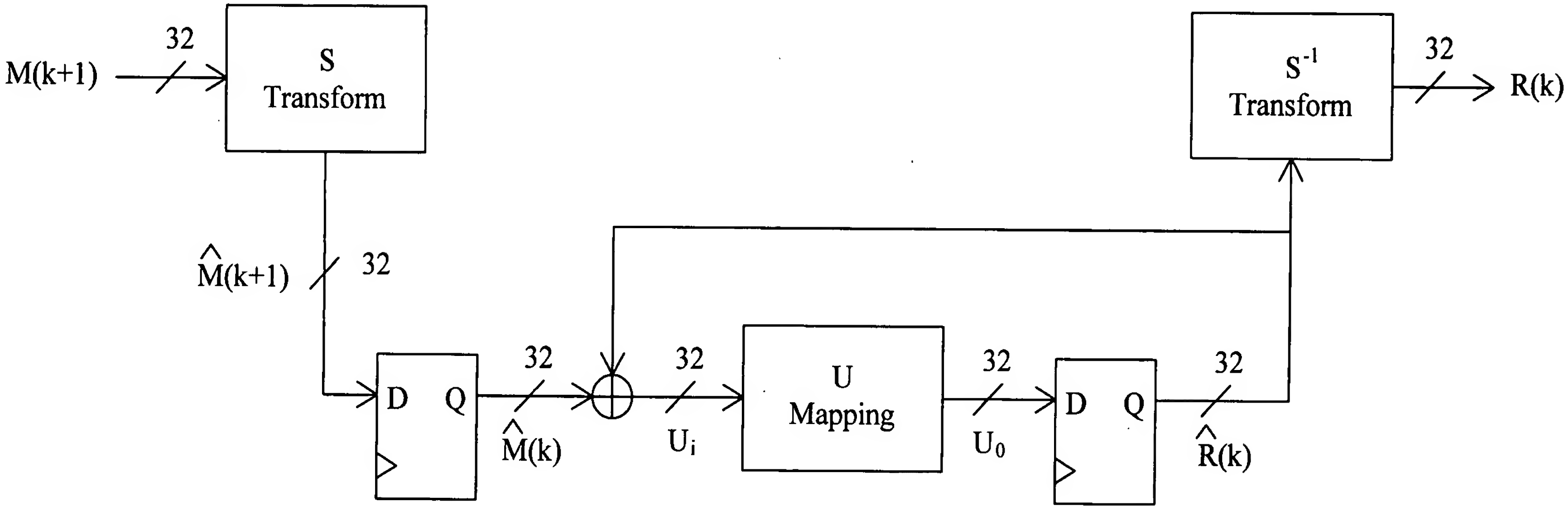

M(k+1)
32
S
Transform
$\hat{M}(k+1)$
32
D
Q
32
$\hat{M}(k)$
32
U_i
U
Mapping
32
U_0
D
Q
32
$\hat{R}(k)$
S^{-1}
Transform
32
R(k)

Fig. 7

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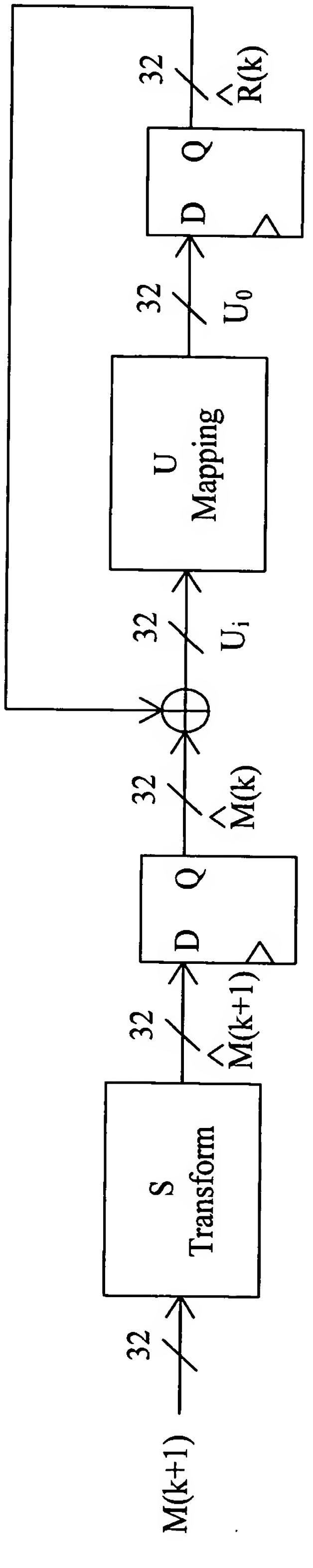

Fig. 8

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$$U_{32} = \left(\begin{array}{ll}
\text{Row31} & \text{0xfb808a20} \\
\text{Row30} & \text{0x7dc04590} \\
\text{Row29} & \text{0xbee022c8} \\
\text{Row28} & \text{0x5e70116d} \\
\text{Row27} & \text{0x2fb809b2} \\
\text{Row26} & \text{0x97dc0459} \\
\text{Row25} & \text{0xb06e8804} \\
\text{Row24} & \text{0x5837448e} \\
\text{Row23} & \text{0xac1ba243} \\
\text{Row22} & \text{0xac8d5b00} \\
\text{Row21} & \text{0xad462620} \\
\text{Row20} & \text{0x57a31311} \\
\text{Row19} & \text{0x2b518888} \\
\text{Row18} & \text{0x95a8c4cc} \\
\text{Row17} & \text{0xcad46262} \\
\text{Row16} & \text{0x646a3130} \\
\text{Row15} & \text{0x483593b9} \\
\text{Row14} & \text{0x249ac8d4} \\
\text{Row13} & \text{0x924d64e6} \\
\text{Row12} & \text{0x6610e0b0} \\
\text{Row11} & \text{0x0fd1ce00} \\
\text{Row10} & \text{0xb4096225} \\
\text{Row9} & \text{0x20843b3f} \\
\text{Row8} & \text{0x91c21c1a} \\
\text{Row7} & \text{0x33e185a5} \\
\text{Row6} & \text{0x627048fe} \\
\text{Row5} & \text{0x313824fb} \\
\text{Row4} & \text{0xe21c9854} \\
\text{Row3} & \text{0x8a0ec786} \\
\text{Row2} & \text{0x4f09a449} \\
\text{Row1} & \text{0x18033bc2} \\
\text{Row0} & \text{0xf6011640}
\end{array}\right)
\begin{array}{l}
12 \\ 13 \\ 14 \\ 15 \\ 15 \\ 15 \\ 11 \\ 14 \\ 14 \\ 13 \\ 12 \\ 14 \\ 11 \\ 14 \\ 14 \\ 12 \\ 15 \\ 13 \\ 15 \\ 11 \\ 13 \\ 12 \\ 14 \\ 12 \\ 15 \\ 15 \\ 15 \\ 13 \\ 15 \\ 13 \\ 12 \\ 11
\end{array}$$

Fig. 9

$$S_{32} = S_{32}^{-1} = \left(\begin{array}{ll}
\text{Row31} & \text{0x80000000} \\
\text{Row30} & \text{0x40000000} \\
\text{Row29} & \text{0x20000000} \\
\text{Row28} & \text{0x10000000} \\
\text{Row27} & \text{0x08000000} \\
\text{Row26} & \text{0x04000000} \\
\text{Row25} & \text{0x02000000} \\
\text{Row24} & \text{0x01000000} \\
\text{Row23} & \text{0x00800000} \\
\text{Row22} & \text{0x00400000} \\
\text{Row21} & \text{0x00200000} \\
\text{Row20} & \text{0x00100000} \\
\text{Row19} & \text{0x00080000} \\
\text{Row18} & \text{0x00040000} \\
\text{Row17} & \text{0x00020000} \\
\text{Row16} & \text{0x00010000} \\
\text{Row15} & \text{0x00008000} \\
\text{Row14} & \text{0x00004000} \\
\text{Row13} & \text{0x00002000} \\
\text{Row12} & \text{0x01001001} \\
\text{Row11} & \text{0x00000900} \\
\text{Row10} & \text{0x00000400} \\
\text{Row9} & \text{0x00000200} \\
\text{Row8} & \text{0x00000100} \\
\text{Row7} & \text{0x00000080} \\
\text{Row6} & \text{0x00000040} \\
\text{Row5} & \text{0x00000020} \\
\text{Row4} & \text{0x00000010} \\
\text{Row3} & \text{0x00000008} \\
\text{Row2} & \text{0x0000000c} \\
\text{Row1} & \text{0x00000002} \\
\text{Row0} & \text{0x00000001}
\end{array}\right)
\begin{array}{c}
1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 3 \\ 2 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 2 \\ 1 \\ 1
\end{array}$$

Fig. 10

$$U_{tx\_08} = \left(\begin{array}{ll}
\text{Row31} & \text{0x20800000} \\
\text{Row30} & \text{0x90400000} \\
\text{Row29} & \text{0xc8200000} \\
\text{Row28} & \text{0x64100000} \\
\text{Row27} & \text{0xb2080000} \\
\text{Row26} & \text{0x59040000} \\
\text{Row25} & \text{0x0c020000} \\
\text{Row24} & \text{0x86010000} \\
\text{Row23} & \text{0x03008000} \\
\text{Row22} & \text{0x21004000} \\
\text{Row21} & \text{0x00002000} \\
\text{Row20} & \text{0x00001100} \\
\text{Row19} & \text{0x88000900} \\
\text{Row18} & \text{0xc4000400} \\
\text{Row17} & \text{0x62000200} \\
\text{Row16} & \text{0x31000100} \\
\text{Row15} & \text{0x28000080} \\
\text{Row14} & \text{0x04200040} \\
\text{Row13} & \text{0x22200020} \\
\text{Row12} & \text{0x08100010} \\
\text{Row11} & \text{0x00000009} \\
\text{Row10} & \text{0x2c000004} \\
\text{Row9} & \text{0x36000002} \\
\text{Row8} & \text{0x1b000001} \\
\text{Row7} & \text{0x8c004000} \\
\text{Row6} & \text{0x92100000} \\
\text{Row5} & \text{0xa2040000} \\
\text{Row4} & \text{0x1c000000} \\
\text{Row3} & \text{0x8e000000} \\
\text{Row2} & \text{0x41010000} \\
\text{Row1} & \text{0xc3000000} \\
\text{Row0} & \text{0x41000000}
\end{array}\right)
\begin{array}{c}
2 \\ 3 \\ 4 \\ 4 \\ 5 \\ 5 \\ 3 \\ 4 \\ 3 \\ 3 \\ 1 \\ 2 \\ 4 \\ 4 \\ 4 \\ 4 \\ 3 \\ 3 \\ 4 \\ 3 \\ 2 \\ 4 \\ 5 \\ 5 \\ 4 \\ 4 \\ 4 \\ 3 \\ 4 \\ 3 \\ 4 \\ 2
\end{array}$$

Fig. 11

$$S_{tx\_08} = S^{-1}_{tx\_08} = \left(\begin{array}{lll}
\text{Row31} & \text{0x80000000} & 1 \\
\text{Row30} & \text{0x40000000} & 1 \\
\text{Row29} & \text{0x20000000} & 1 \\
\text{Row28} & \text{0x10000000} & 1 \\
\text{Row27} & \text{0x08000000} & 1 \\
\text{Row26} & \text{0x04000000} & 1 \\
\text{Row25} & \text{0x02000000} & 1 \\
\text{Row24} & \text{0x01000000} & 1 \\
\text{Row23} & \text{0x00800000} & 1 \\
\text{Row22} & \text{0x00400000} & 1 \\
\text{Row21} & \text{0x00200000} & 1 \\
\text{Row20} & \text{0x00100000} & 1 \\
\text{Row19} & \text{0x00080000} & 1 \\
\text{Row18} & \text{0x00040000} & 1 \\
\text{Row17} & \text{0x00020000} & 1 \\
\text{Row16} & \text{0x00010000} & 1 \\
\text{Row15} & \text{0x40008000} & 2 \\
\text{Row14} & \text{0x20004000} & 2 \\
\text{Row13} & \text{0x20002000} & 2 \\
\text{Row12} & \text{0x10001100} & 3 \\
\text{Row11} & \text{0x00000900} & 2 \\
\text{Row10} & \text{0x00000400} & 1 \\
\text{Row9} & \text{0x00000200} & 1 \\
\text{Row8} & \text{0x00000100} & 1 \\
\text{Row7} & \text{0x00400080} & 2 \\
\text{Row6} & \text{0x10000040} & 2 \\
\text{Row5} & \text{0x04000020} & 2 \\
\text{Row4} & \text{0x00000011} & 2 \\
\text{Row3} & \text{0x00000008} & 1 \\
\text{Row2} & \text{0x01000004} & 2 \\
\text{Row1} & \text{0x00000002} & 1 \\
\text{Row0} & \text{0x00000001} & 1
\end{array} \right)$$

Fig. 12

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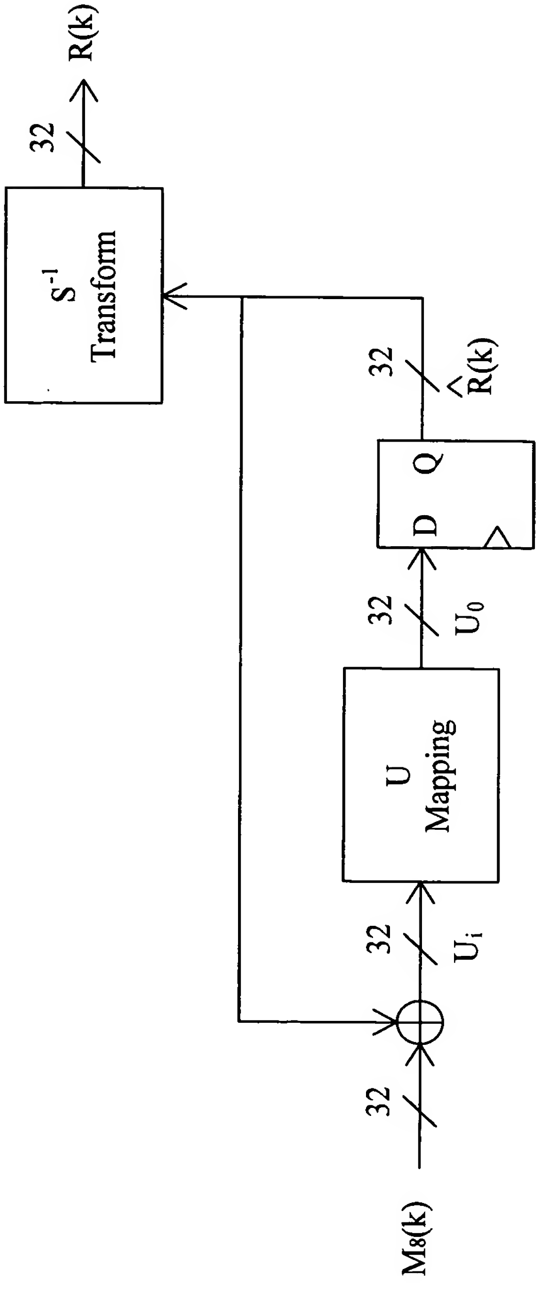

Fig. 13

$$U_{rx\_08} = \left(\begin{array}{ll}
\text{Row31} & \text{0x20800000} \\
\text{Row30} & \text{0x90400000} \\
\text{Row29} & \text{0xc8200000} \\
\text{Row28} & \text{0x64100000} \\
\text{Row27} & \text{0xb2080000} \\
\text{Row26} & \text{0x59040000} \\
\text{Row25} & \text{0x0c020000} \\
\text{Row24} & \text{0x86010000} \\
\text{Row23} & \text{0x03008000} \\
\text{Row22} & \text{0x21004000} \\
\text{Row21} & \text{0x00022000} \\
\text{Row20} & \text{0x00001040} \\
\text{Row19} & \text{0x88000900} \\
\text{Row18} & \text{0xc4000400} \\
\text{Row17} & \text{0x62000200} \\
\text{Row16} & \text{0x31000100} \\
\text{Row15} & \text{0x28000080} \\
\text{Row14} & \text{0x04200040} \\
\text{Row13} & \text{0x00200030} \\
\text{Row12} & \text{0x08500010} \\
\text{Row11} & \text{0x00000009} \\
\text{Row10} & \text{0x2c000004} \\
\text{Row9} & \text{0x36000002} \\
\text{Row8} & \text{0x1b000001} \\
\text{Row7} & \text{0x8c004000} \\
\text{Row6} & \text{0x92100000} \\
\text{Row5} & \text{0x00400002} \\
\text{Row4} & \text{0x04040000} \\
\text{Row3} & \text{0x8e000000} \\
\text{Row2} & \text{0x41010000} \\
\text{Row1} & \text{0xc3000000} \\
\text{Row0} & \text{0x41000000}
\end{array}\right)
\begin{array}{l}
2 \\ 3 \\ 4 \\ 4 \\ 5 \\ 5 \\ 3 \\ 4 \\ 3 \\ 3 \\ 2 \\ 2 \\ 4 \\ 4 \\ 4 \\ 4 \\ 3 \\ 3 \\ 3 \\ 4 \\ 2 \\ 4 \\ 5 \\ 5 \\ 4 \\ 4 \\ 2 \\ 2 \\ 4 \\ 3 \\ 4 \\ 2
\end{array}$$

Fig. 14

$$S_{rx\_08} = \left(\begin{array}{lll}
\text{Row31} & \text{0x80000000} & 1 \\
\text{Row30} & \text{0x40000000} & 1 \\
\text{Row29} & \text{0x20000000} & 1 \\
\text{Row28} & \text{0x10000000} & 1 \\
\text{Row27} & \text{0x08000000} & 1 \\
\text{Row26} & \text{0x04000000} & 1 \\
\text{Row25} & \text{0x02000000} & 1 \\
\text{Row24} & \text{0x01000000} & 1 \\
\text{Row23} & \text{0x00800000} & 1 \\
\text{Row22} & \text{0x00400000} & 1 \\
\text{Row21} & \text{0x00200000} & 1 \\
\text{Row20} & \text{0x00100000} & 1 \\
\text{Row19} & \text{0x00080000} & 1 \\
\text{Row18} & \text{0x00040000} & 1 \\
\text{Row17} & \text{0x00020000} & 1 \\
\text{Row16} & \text{0x00010000} & 1 \\
\text{Row15} & \text{0x40008000} & 2 \\
\text{Row14} & \text{0x20004000} & 2 \\
\text{Row13} & \text{0x20022000} & 3 \\
\text{Row12} & \text{0x00001040} & 2 \\
\text{Row11} & \text{0x00000900} & 2 \\
\text{Row10} & \text{0x00000400} & 1 \\
\text{Row9} & \text{0x00000200} & 1 \\
\text{Row8} & \text{0x00000100} & 1 \\
\text{Row7} & \text{0x00400080} & 2 \\
\text{Row6} & \text{0x10000040} & 2 \\
\text{Row5} & \text{0x40000230} & 4 \\
\text{Row4} & \text{0x04000010} & 2 \\
\text{Row3} & \text{0x00000008} & 1 \\
\text{Row2} & \text{0x01000004} & 2 \\
\text{Row1} & \text{0x00000002} & 1 \\
\text{Row0} & \text{0x00000001} & 1
\end{array} \right)
\qquad
S^{-1}_{rx\_08} = \left(\begin{array}{ll}
\text{Row31} & \text{0x80000000} \\
\text{Row30} & \text{0x40000000} \\
\text{Row29} & \text{0x20000000} \\
\text{Row28} & \text{0x10000000} \\
\text{Row27} & \text{0x08000000} \\
\text{Row26} & \text{0x04000000} \\
\text{Row25} & \text{0x02000000} \\
\text{Row24} & \text{0x01000000} \\
\text{Row23} & \text{0x00800000} \\
\text{Row22} & \text{0x00400000} \\
\text{Row21} & \text{0x00200000} \\
\text{Row20} & \text{0x00100000} \\
\text{Row19} & \text{0x00080000} \\
\text{Row18} & \text{0x00040000} \\
\text{Row17} & \text{0x00020000} \\
\text{Row16} & \text{0x00010000} \\
\text{Row15} & \text{0x40008000} \\
\text{Row14} & \text{0x20004000} \\
\text{Row13} & \text{0x20022000} \\
\text{Row12} & \text{0x10001040} \\
\text{Row11} & \text{0x00000900} \\
\text{Row10} & \text{0x00000400} \\
\text{Row9} & \text{0x00000200} \\
\text{Row8} & \text{0x00000100} \\
\text{Row7} & \text{0x00400080} \\
\text{Row6} & \text{0x10000040} \\
\text{Row5} & \text{0x44000230} \\
\text{Row4} & \text{0x04000010} \\
\text{Row3} & \text{0x00000008} \\
\text{Row2} & \text{0x01000004} \\
\text{Row1} & \text{0x00000002} \\
\text{Row0} & \text{0x00000001}
\end{array} \right)
\begin{array}{l}
1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ 2 \\ 2 \\ 3 \\ 3 \\ 2 \\ 1 \\ 1 \\ 1 \\ 2 \\ 2 \\ 5 \\ 2 \\ 1 \\ 2 \\ 1 \\ 1
\end{array}$$

Fig. 15

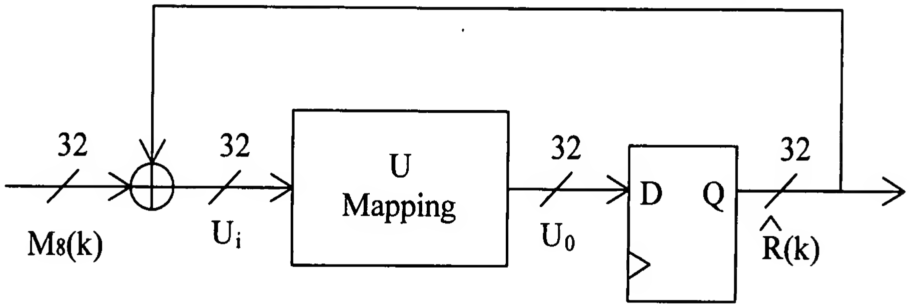

Fig. 16